

First Record of *Gyrodactylus longiradix* Malmberg, 1957 (Monogenea: Gyrodactylidae) from Three Iraqi Freshwater Fish Species

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Abstract: The monogenean *Gyrodactylus longiradix* Malmberg, 1957 is recorded in the present study for the first time in Iraq from gills of three species of fishes: *Arabibarbus grypus* (Heckel, 1843), *Coptodon zillii* (Gervais, 1848) and the common carp *Cyprinus carpio* Linnaeus, 1758, which were collected from Tigris river at Al-Taji beach, north of Baghdad city during the period from July until November 2018. The description and measurements of this parasite were given as well as its illustrations.

Keywords: *Gyrodactylus longiradix*, *Arabibarbus grypus*, *Coptodon zillii*, *Cyprinus carpio*, Monogenea, Iraq.

Introduction

The genus *Gyrodactylus* von Nordmann, 1832 is one of 23 genera of the family Gyrodactylidae, with 19 viviparous and four oviparous genera (Bakke et al., 2007). However, MonoDb (2019) listed 33 valid genera in this family. According to GBIF (2019), this family includes 33 genera and 629 species. Species of this genus, which have direct life cycle (without intermediate hosts), are common ectoparasites of fishes, living on the skin, fins and gills of many teleost fishes and occur in freshwater, brackish water and marine environments (Buchmann & Bresciani, 2006). There are 409 potentially valid species names within this genus, recorded from c.400 host species (Harris et al., 2004). According to Bakke et al. (2002), these directly transmitted viviparous gyrodactylids have high species richness but low morphological and biological diversity, many species were recorded from only a single host and this group has the widest host range of any monogenean family, being found on 19 orders of bony fishes. A morphological identification method has been developed by Malmberg (1970), mainly based on the hard parts of the haptor, with the marginal hook features being crucial for discrimination of very closely related species.

In Iraq, many *Gyrodactylus* species have been described from freshwater fishes from different water bodies. Ali & Shaaban (1984) reported the first gyrodactylid species, *G. elegans* Nordmann, 1832 from gills of both *Cyprinus carpio* and *Planiliza abu* (which was reported as *Liza abu*). Later on, many studies on parasites of fishes from different water bodies of Iraq were carried out, among which some reported first records of some *Gyrodactylus* species in Iraq (Ali et al., 1988; Salih et al., 1988; Abdul-Ameer, 1989; Mhaisen et al., 1990; Al-Zubaidy, 1998; Abdullah, 2002; Jori, 2006; Al-Zubaidy, 2007; Mama, 2012; Abdul-Ameer & Al-Saadi, 2013a, b; Abdullah, 2013; Kritsky et al., 2013; Nasraddin, 2013; Al-Salmany, 2015; Al-Saadi & Rasheed, 2016; Atwan, 2016; Abdul-Ameer & Atwan, 2017; Hammood, 2017; Mohammed, 2017; Abbas, 2019; Sheyaa & Abdul-Ameer, 2019). Therefore, more surveys on fish parasites are needed to identify more species and to match the growing information on the parasitic fauna of freshwater fishes of Iraq. The present study

deals with the record of *Gyrodactylus longiradix* Malmberg, 1957 from Tigris river at Al-Taji beach, northern of Baghdad city for the first time in Iraq.

Materials and Methods

During the period from July until November 2018, a total of 73 fishes belonging to three species: 18 *Arabibarbus grypus* (Heckel, 1843), 25 common carp *Cyprinus carpio* Linnaeus, 1758 and 30 redbelly tilapia *Coptodon zillii* (Gervais, 1848) were collected from the Tigris river at Al-Taji beach, north of Baghdad city (33° 27' 19" N, 44° 20' 58" E). The fishes were transported alive to the laboratory and were identified according to Coad (2010), then freshly examined for ectoparasites. Skin and gill smears were prepared and microscopically examined. Care was taken to isolate and flatten the parasite specimens, which were then stained with aqueous neutral red. Permanent slides were then prepared with glycerin Jelly according to Zander (2014). Drawings of the sclerotized pieces of the haptor were made by using a camera Lucida. Parasite identification was performed according to Pugachev et al. (2009). All measurements used in the description are presented in the following order: minimum-maximum (mean) values. Updating the scientific name of fishes was done according to Froese & Pauly (2019). The information on the previous account records of gyrodactylids of fishes of Iraq were reviewed with the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2019) by a correspondence via e-mail.

Results and Discussion

The present study showed the occurrence of the monogenean *Gyrodactylus longiradix* Malmberg, 1957 infecting gills of three species of fishes: *A. grypus*, *C. zillii* and *C. carpio* with a prevalence of 5.5 %, 3.3 % and 12 %, respectively. The following is a brief description and measurements of this monogenean (in mm based on four specimens) as shown in Figure 1.

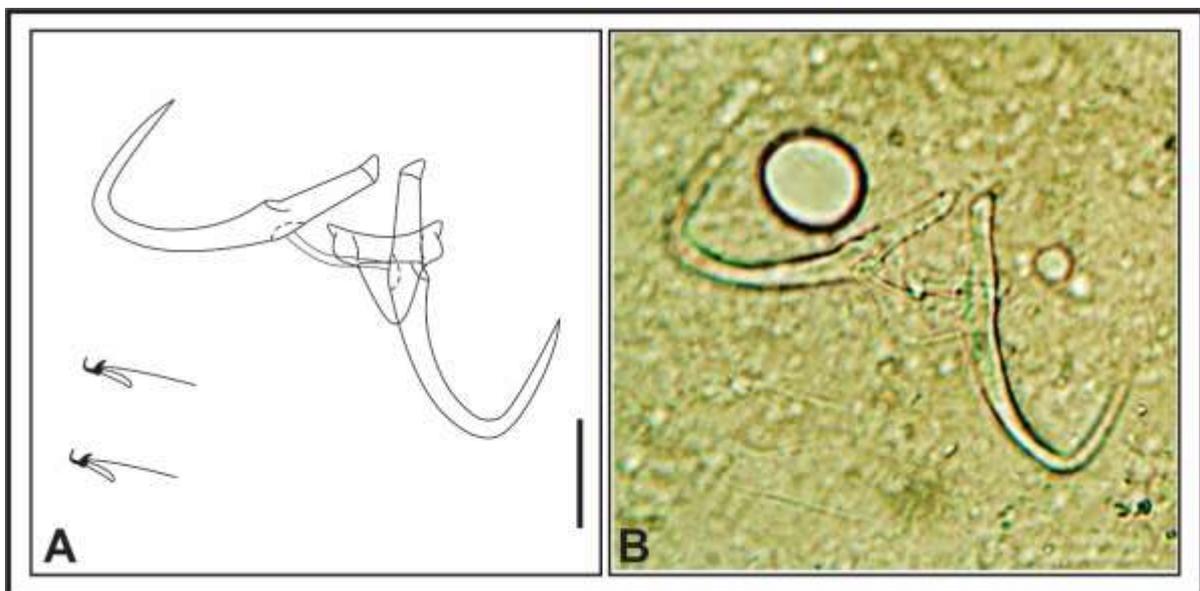


Figure 1: *Gyrodactylus longiradix*. A: Camera Lucida drawing (Scale bar 0.065 mm).

B: Photomicrograph of stained specimen (400x).

Body length 0.7-1.1 (0.9). Total length of marginal hooks 0.032-0.038 (0.035), hooklet 0.008-0.001 (0.009). Total length of anchors 0.079-0.086 (0.082), main part 0.052-0.054 (0.053), point 0.03-0.04 (0.035), inner root 0.023-0.029 (0.026). Size of ventral bar 0.008-

0.012 (0.01) x 0.032-0.036 (0.034), membrane 0.016-0.022 (0.018). Size of dorsal bar 0.0018-0.001(0.0014) x 0.023-0.025 (0.024).

The description and measurements of the present *G. longiradix* are in agreement with those reported by Pugachev et al. (2009) from fins and skin of *Gobio gobio* (Linnaeus, 1758), *Rutilus rutilus* (Linnaeus, 1758), *Gymnocephalus cernua* (Linnaeus, 1757), *Parca faviatilis* Linnaeus, 1758, and *Sander lucioperca* (Linnaeus, 1758) in the Palearctic. According to Mhaisen (2019), the present report of *G. longiradix* represents its first record in Iraq, as no previous record was given for this parasite from fishes of Iraq.

With the present record of *G. longiradix*, the number of *Gyrodactylus* species from fishes of Iraq so far reaches 55 species (Mhaisen, 2019), among which 20 species were reported from *A. grypus*, 15 species from *C. zillii* and 36 species from *C. carpio*. In addition to these species, some unidentified specimens of this genus were reported from *C. zillii* and *C. carpio* and no unidentified specimen of this genus was reported from *A. grypus*.

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